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Impact of Different Plant Extracts on Wilt Causing Fusaria of Guava (*Psidium guajava* L.)

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Abstract

A new approach for controlling soil borne Fusarial wilt pathogens by leaf extracts of some medicinal plants yielded satisfactory results in the present study. Leaf extracts of *Strychnos nuxvomica, Mentha arvensis, Allium cepa, Datura stramonium, Azadirachta indica, Ocimum sanctum* and *Allium sativum* were found to be effective during spore germination of the seven pathogenic *Fusarium* spp., isolated from guava fields. Leaf extracts of *Azadirachta indica, Allium cepa* and *Allium sativum* at 100% concentration completely checked the spore germination of all the seven species of the pathogenic Fusaria. Results of germination of *Fusarium oxysporum*, *Fusarium solani, fusarium equiseti*, *fusarium moniliforme, Fusarium accuminatum, Fusarium fusarioides* and *Fusarium semitectum* were 95, 95, 90, 96, 92, 96 and 95% respectively in the control sets (distilled water).

Key words : Fusarium, Guava, Plant extracts, Wilt.

Guava (Psidium guajava L.) wilt is a serious disease of guava causing severe damage in the most of the guava growing areas of Uttar Pradesh, India. Fungi reproduce and spread mainly by spores. Spores are minute, separable bodies with a special characteristic of the particular species. the commonest type of spores produced by the fungi are asexual germination of fungal spores is essentially a process during which the normal metabolic and physiological activity is restored after dormancy. Leaves of several plants have been reported to possess chemicals, toxic to various micro-organisms and serve as chemical protective barrier to the infection. Antifungal property of several plant extracts has been reported by various workers (Bansal and Gupta 2000, Shivpuri et al. 1997, Saxena et al. 2005, Grayer and Harborne 1994). Present investigation deals with the influence of different plant extracts on wilt causing Fusaria of guava.

Methods

Efficacy of each plant extract against spore germination of Fusarium spp. was tested by two concentrations viz. 50 and 100%. Plant parts were throughly washed with sterilized distilled water and were grinded separately in electric grinder using equal amount of sterilized distilled water to get stock solution. The mixture was squeezed through double-layered sterilized cheese cloth. The extract thus obtained was considered as of 100% concentration. For utilization of 50% concentration 50% distilled water was added in same volume of plant extract.

For spore germination assay, the spore suspension was prepared in sterilized distilled water to get 10-12 conidia per microscopic field (10× 10×). A loop full of spore suspension was put on a clean glass slide and allowed to air-dry. Just after air-drying, a drop of plant extract suspension of required concentration was put separately on the air-dried portion of glass slide. The slide was then accommodated in a moist chamber made by placing two moist filter paper in the bottom of a petridish. Two glass rods were positioned on the bottom of each petridish over the filter papers to support the glass slide. Two slides were accommodated in each moist chamber and incubated for 24 at 25±1C (Anonymous 1947).

The germination of spore was recorded after 24 h of incubation by examining eight slides constituting four replications of a treatment. Before microscopic examination, a drop of lactophenol was added. Per-

Table 1. Effect of leaf extract of various medicinal plants on spore germination of *Fusarium* spp. Figure is average of four replications.

			Percentage spore germination						
	Leaf extract	Conc. (%)	F. oxys-porum	F. solani	F. equiseti	F. monili-forme	F. accumi-natum	F. fusa-rioides	F. semite-ctum
1	Strynchnos nuxvomica	50	66.00	76.00	75.50	66.07	63.19	52.57	83.07
		100	35.00	30.00	34.60	36.60	31.50	25.31	44.60
2	Mentha arvensis	50	42.00	45.50	41.00	46.50	39.00	41.00	44.50
		100	22.00	25.00	24.50	26.50	27.00	24.50	26.50
3	Allium cepa	50	22.60	18.60	25.60	20.66	20.70	26.80	25.98
		100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Datura stramonium	50	62.00	65.00	64.00	68.00	62.00	55.50	64.00
		100	30.00	31.50	29.00	30.00	28.50	27.00	33.00
5	Azadirachta Indica	50	20.5	10.50	20.0	25.07	19.06	18.80	20.00
		100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Ocimum sanctum	50	70.60	6.67	64.60	58.60	55.60	58.80	57.80
		100	35.46	36.50	28.80	32.60	36.50	40.80	35.50
7	Allium sativum	50	16.70	5.60	15.80	10.00	15.80	18.70	15.87
		100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Control		95°	95	90	96	92	96	95

cent inhibition of spore germination was calculated following the formula of vincent (1947). Percentage germination of the spores was recorded after their initial time of germination.

Results and Discussion

Table 1 shows that out of seven medicinal plants tried, leaf extracts of onion (*Allium cepa*), neem (*Azadirachta indica*) and garlic (*Allium sativum*) at 100% concentration completely checked the spore germination of all the seven fungi . *Mentha arvensis* and *Datura stramonium* (100%) exhibited antifungal property, where spores of *Fusarium oxysporum, F. solani, F. equiseti, F. moniliforme, F. accuminatum, F. fusarioides* and *F. semitectum* could germinate up to 22, 25, 24.5, 26.5, 27, 24.5, 26.5% and 30, 31.5, 29, 30, 28.5, 27, 33% respectively. The spore germination of *Fusarium oxysporum, F. solani, F.equiseti, F. moniliforme, F.accuminatum, F. fusarioides* and *F. semitectum* in control was 95, 90. 95, 90, 96, 92, 96 and 95%, respectively.

Different workers investigated the effect of leaf extracts of various medicinal plants on spore germination of pathogenic fungi. Shekhawat and Prasad (1971) tried leaf extract of *Melia azadirachta*.*Ocimum sanctum* and *Allium sativum* against 41 species of pathogenic fungi out of which *Curvularia penniseti* and *Helminthosporium* spp. were found to be unable to germinate on *Melia azadirachta* and *Ocimum sanctum* leaf extracts. Mishra et al. (1974a, b) reported complete inhibition of spore germination of *Curvularia lunata* and *Helminthosporium graminicola* in leaf extract of *Melia azadirachta* and *Ocimum sanctum* respectively. Khanna and Chandra (1972) have also reported similar observation for the fungi studied by them. Leaf extracts of some medicinal plants which were found to be effective during spore germination were also tried for controlled the wilt plants at the seedling stage. Tripathi (1980 and Shukla (2000) also reported similar observations for the fungi.These extracts control the wilt disease effectively at seedling stage of guava in the present study.

References

Anonymous. 1947. Test tube dilutition technique for use with slide germination method of evaluation protectant fungicides. Committee on standardization of fungicidal test.*Phytopath*. 37 : 354—356.

Bansal R. K. and R. Gupta. 2000. Evaluation of plant extracts against *Fusarium oxysporum* wilt pathogen of fenugreek. *Indian Phytopath*. 53 : 107—108.

Grayer R. J. and J. B. Harborne. 1994. A survey of antifungal compound from higher plants. *Phytochem*. 37 : 19–42.

Khanna K. K. and S. Chandra. 1972. Antifungal Activity of some plant extracts. *Proc. Nat. Acad. Sci. India*. 62B : 300—302.

Mishra S. B., R. R. Mishra and S. N. Dixit . 1974a. Screening of leaves of higher plants for antifungal activity. *Nat. Acad. Sci. India*. 159 : 75

Mishra S. B., R. R. Mishra and S. N. Dixit. 1974b. Screening of leaves of higher plants for antifungal activity. *Nat.Acad. Sci. India.* 160 : 76.

Saxena A. R. R. K. Sahni, H. L. Yadav, S. K. Upadhyay and M. Saxena. 2005. Antifungal activity of some higher plants against *fusarium oxysporum* F. sp. *Psidii. J. Liv World* 12 : 32–39.

Shekhawat P. S. and P. Prasad. 1971. Antifungal properties of some plant extracts 1. Inhibition of spore germination. *Indian Phytopath*. 24 : 800—802.

Shivpuri A., O. P. Sharma and S. L. Jhamaria. 1997. Fungitoxic properties of plant extracts against pathogenic fungi. *J. Mycol. P. Pathol*. 27 : 29–31.

Shukla D. N. 2000. *Biological relationship and effect of environmental factors on disease development of pulses and oil crop*. D. Sc. thesis. Allahabad Cen. Univ., Allahabad, India.

Tripathi N. N.1980. Fungitoxicity in some higher plants. Ph. D. thesis. Gorakhpur Univ. Gorakhpur, India.

Vincent M. 1947. Distortion of fungal hypha in presence of certain inhibitors. 196—203.